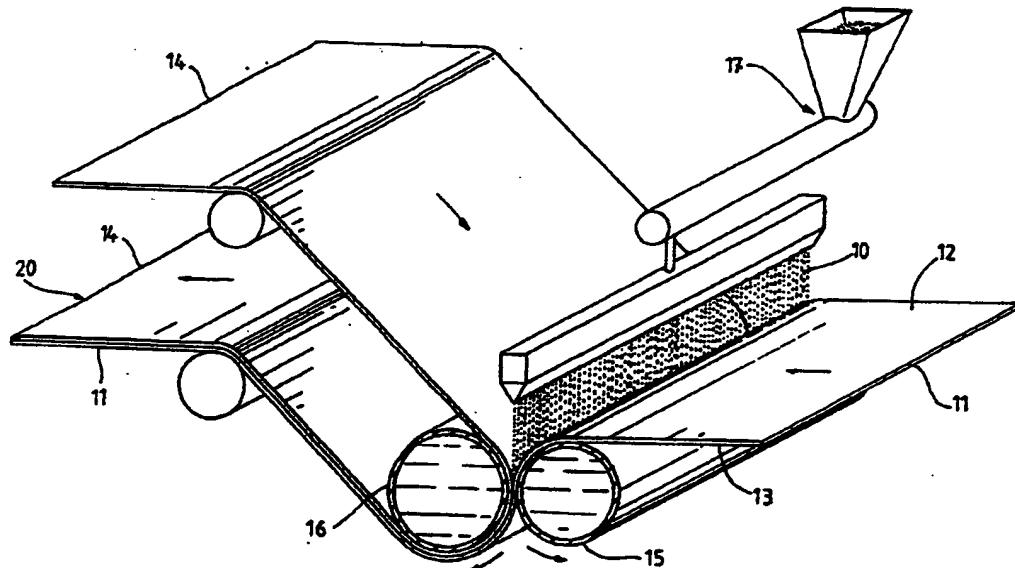




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :	A1	(11) International Publication Number: WO 94/16138
D06N 7/00, B32B 27/12		(43) International Publication Date: 21 July 1994 (21.07.94)
(21) International Application Number: PCT/BE94/00002		(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 7 January 1994 (07.01.94)		
(30) Priority Data:		Published
9300019 8 January 1993 (08.01.93) BE		With international search report. In English translation (filed in Dutch).
9300762 20 July 1993 (20.07.93) BE		
(71) Applicant (for all designated States except US): BERCPA S.A. [LU/LU]; Boulevard Prince-Henri II, L-2014 Luxembourg (LU).		
(72) Inventor; and		
(73) Inventor/Applicant (for US only): SCHMITZ, Claude [LU/LU]; Boulevard Prince-Henri II, L-2014 Luxembourg (LU).		
(74) Agents: VANDERPERRE, Robert et al; Bureau Vander Haeghen, Rue Colonel Bourg 108A, B-1040 Brussels (BE).		

(54) Title: METHOD FOR MANUFACTURING CARPETS



(57) Abstract

For the purpose of manufacturing carpets comprising a top layer at the top and at least one backing layer at the back thereof, the top layer (11) on the one side and the backing layer (14) on the other side are simultaneously pressed together with an extruded plastic (10) flowing down therebetween, said plastic flowing down being solidified together in such a way that the top layer is fixed thereby to said backing layer.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Beira	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BT	Belarus	KR	Korea	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	L1	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Lviv	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

METHOD FOR MANUFACTURING CARPETS

The invention relates to the manufacture of carpets consisting mainly of plastic.

Plastic has indeed been used previously for manufacturing carpets. The manufacture of tufted carpets, for example, is carried out by needling a polypropylene yarn into a base fabric each time along the back thereof, so that small loops are formed on the other side of the base fabric. Then the small loops are either cut or retained as loops. On the back of the base fabric a latex layer is then applied which secures the yarn along the back of the fabric and prevents it from coming loose. To said latex layer a backing layer is then applied which consists of latex foam or jute-like fabric depending on the intended use of the carpet.

Woven carpet is manufactured by pulling a polypropylene yarn through between warp threads and weft threads. In known woven carpets, the warp thread consists of cotton and the weft thread normally of jute. A backing layer is applied on the back.

In the case of needlefelt carpets, a needlefelt is made of plastic and on the back a backing layer is then applied which normally consists of latex foam.

A drawback of such known carpets is that the manufacture thereof requires a so-called two-way system, in which the base fabric and the backing layer are moved separately.

Even in known carpets, at least two different base materials are used. This has the drawback that such carpets cannot be recycled completely, because in this case an impure plastic is obtained, which results in environmental pollution.

However, there are thermoformed carpets which largely consist of polyethylene. Such carpets are used in the car industry. The products added when manufacturing such carpets have the inevitable result, however, that recycling produces an impure plastic which is not readily reusable.

One object of the present invention is to present a novel carpet development, in particular a novel method for manufacturing plastic carpets.

In order to achieve the abovementioned object, 5 the present invention provides a method for manufacturing a carpet comprising a top layer (pile, fabric or needle-felt) at the top and a backing layer at the back thereof, the top layer on the one side and said backing layer on the other side being simultaneously pressed together with 10 an extruded plastic flowing down therebetween, said plastic flowing down being solidified together in such a way that the top layer is fixed thereby to said backing layer.

For example, the pressing together of said layers 15 is effected by making them converge between two cooled rollers positioned parallel and next to one another. The spacing between the rollers is controlled in accordance with the total thickness of the carpet.

This method has the advantage that it provides 20 for an economical manufacturing process which, moreover, is genuinely environmentally compatible, because the production process does not give rise to waste waters or the generation of smoke. As a result a carpet is obtained, comprising a top layer and a backing layer at the 25 back thereof, the top layer being fixed to the backing layer by a solidified plastic layer.

The method according to the invention is suitable 30 for manufacturing, primarily, tufted carpets, woven carpets and needlefelt carpets. It should be emphasised that, as a further advantage of said carpets made in the abovementioned manner, these are completely waterproof.

In particular, it is also an object of the invention to present plastic carpets which can be 35 recycled completely. This object is achieved by using one and the same base material for the yarn, the backing layer, the possible base fabric and for the plastic flowing down. When recycling the carpet, a virtually 100% pure granular material is then obtained which, for example, can be reused for manufacturing the backing

layer of new carpets, which has both economical advantages and advantages with regard to reduced environmental pollution. However, the granular material obtained may, for example, also be employed in the plastics industry for applications in injection and extrusion.

5 The invention will now be explained in more detail with reference to the accompanying drawings.

In Figure 1, reference number 11 indicates a top layer which may form the top side of a carpet, whether a 10 tufted fabric, a woven fabric or a needlefelt. The back 12 of the layer 11 is turned upwards, and the top 13 thereof is turned downwards. The layer 11 consists of any plastic or natural product or a mixture of a plurality of these.

15 Said layer 11 is moved as a whole between two rollers 15 and 16, respectively, which are positioned parallel and next to one another. Said rollers are water cooled and the spacing between them can be regulated. There is likewise arranged between the rollers a backing 20 layer 14, either felt or web or fabric, or some other, which consists of any plastic or natural product.

25 Between the top layer 11 and the backing layer 14, a molten plastic 10 is made to flow down by means of an extruder 17. The extruder 17 is fed with a plastic granules or plastic powder. Thus the layers 11, 14 and the molten plastic 10 are pressed together, the backing layer 14 being directly bonded to the pile yarn and said pile yarn being fixed perfectly. The spacing between the rollers is regulated in order to exert a pressure on the 30 running layers therebetween in accordance with the total thickness of the carpet. Cooling of the rollers is adjusted to the speed of the layers therebetween. Thus a robust, finished carpet 20 is obtained in one step.

35 It should be noted that the manufacturing process is considerably simplified with respect to the conventional coating procedures and is thus economical. Moreover, the process according to the invention is genuinely environmentally compatible, as it does not give rise to wastewater or the generation of smoke.

Preferably, only those plastics are employed which can be recycled in the form of granules.

To summarise, the invention relates to the creating or laminating together of any top layer, either 5 pile or woven fabric or needlefelt, with a backing layer, either felt or web or fabric or another, made of any plastic or natural product, by means of any extruded plastic.

For the top layer, one or more of the following 10 base materials can be used, for example: inter alia polypropylene, polyethylene, polyester, polyamide, polyacrylic, wool.

Regarding the backing layer, one or more of the following base materials can be used, for example: inter 15 alia polypropylene, polyethylene, polyester, polyamide, polyacrylic, jute, cotton.

As far as the extruded plastic is concerned, one or more among the following plastics may be used: inter alia, polypropylene, polyethylene, polyester, polyamide, 20 polyacrylic. All the plastics can also be used with the addition of CaCO₃.

By means of the invention, a carpet is obtained which comprises a top layer at the top and a backing layer at the back thereof, the top layer being fixed to 25 the backing layer by a solidified plastic interlayer.

Figure 2, for example, represents a tufted carpet in which the top layer comprises a base cloth 11a and a pile yarn 11b needled thereinto. The top layer, i.e. the 30 pile yarn together with the base cloth, is fixed to the backing layer 14 by the solidified plastic interlayer 10.

In the case of tufted or needlefelt carpets, in which said backing layer consists of a plastic felt, the method can be used in such a way that a second extruded 35 plastic is made to flow down at the rear side of the plastic felt in such a way that a plastic fabric can be bonded thereto. Figure 3 shows a carpet comprising a second solidified plastic interlayer 18 with a plastic fabric 19 thereon.

It is furthermore possible, by employing one and

- 5 -

the same base material for the top layer, the backing layer and the extruded plastic, to manufacture plastic carpets which can be recycled completely, a virtually 100% pure granular material being obtained in the 5 process. Moreover, it is possible to use, for the interlayer to be extruded, a recycled granular material or powder, resulting in a reduction in cost of manufacturing.

CLAIMS

1. Method for manufacturing a carpet comprising a top layer (11) at the top and at least one backing layer (14) at the back thereof, characterized in that the top layer (11) on the one side and said backing layer (14) on the other side are simultaneously pressed together with an extruded plastic (10) flowing down therebetween, said plastic flowing down being solidified together in such a way that the top layer is fixed thereby to said backing layer.
5. Method according to Claim 1, characterized in that the plastic flowing down is an extruded plastic granular material or plastic powder.
10. Method according to Claim 1 or 2, characterized in that the pressing together of said layers is effected by making them converge between two cooled rollers positioned parallel and next to one another, the spacing between the rollers being controlled in accordance with the total thickness of said layers.
15. Method according to Claim 3, characterized in that the cooling of the rollers is adjusted to the speed of the layers therebetween.
20. Method according to any one of Claims 1 to 4 inclusive, characterized in that there is used for the top layer a plastic, a natural product or a mixture of a plurality thereof.
25. Method according to any one of Claims 1 to 5 inclusive, characterized in that there is used for the backing layer a plastic, a natural fabric or a mixture of plastic and natural product.
30. Method according to any one of Claims 1 to 6 inclusive, characterized in that there is used for the top layer, the backing layer and the plastic flowing down, at least one plastic which can be recycled completely, a granular material or a powder being obtained in the process.
35. Method according to Claim 7, characterized in that there is used for the top layer, the backing layer and the plastic flowing down, one and the same plastic

which can be recycled completely, a granular material or powder of virtually 100% purity being obtained in the process.

5. 9. Carpet comprising a top layer at the top and a backing layer at the bottom thereof, which has been manufactured according to the method defined in any one of the preceding claims.

10. 10. Carpet according to Claim 9, characterized in that said top layer is fixed to the backing layer by a solidified plastic interlayer.

15. 11. Carpet according to Claim 10, characterized in that said layers consist of at least one plastic which can be recycled completely, a granular material or powder being obtained in the process.

12. 15. Carpet according to Claim 10 or 11, characterized in that the top layer consists of at least one plastic, a natural product or a mixture of a plurality of these.

13. 16. Carpet according to any one of Claims 10 to 12 inclusive, characterized in that the backing layer consists of an action back plastic layer.

14. 17. Carpet according to any one of Claims 10 to 12 inclusive, characterized in that the backing layer consists of a plastic felt.

15. 18. Carpet according to Claim 14, characterized in that a plastic fabric is bonded to the plastic felt by a plastic layer.

16. 19. Carpet according to any one of Claims 12 to 15 inclusive, characterized in that the backing layer consists of a fabric made of a natural product.

30. 20. Carpet according to any one of Claims 12 to 16 inclusive, characterized in that the top layer consists of a tufted fabric.

18. 21. Carpet according to any one of Claims 12 to 16 inclusive, characterized in that the top layer consists 35 of a woven fabric.

19. 22. Carpet according to any one of Claims 12 to 16 inclusive, characterized in that the top layer consists of a needlefelt.

WO 94/16138

PCT/BE94/00002

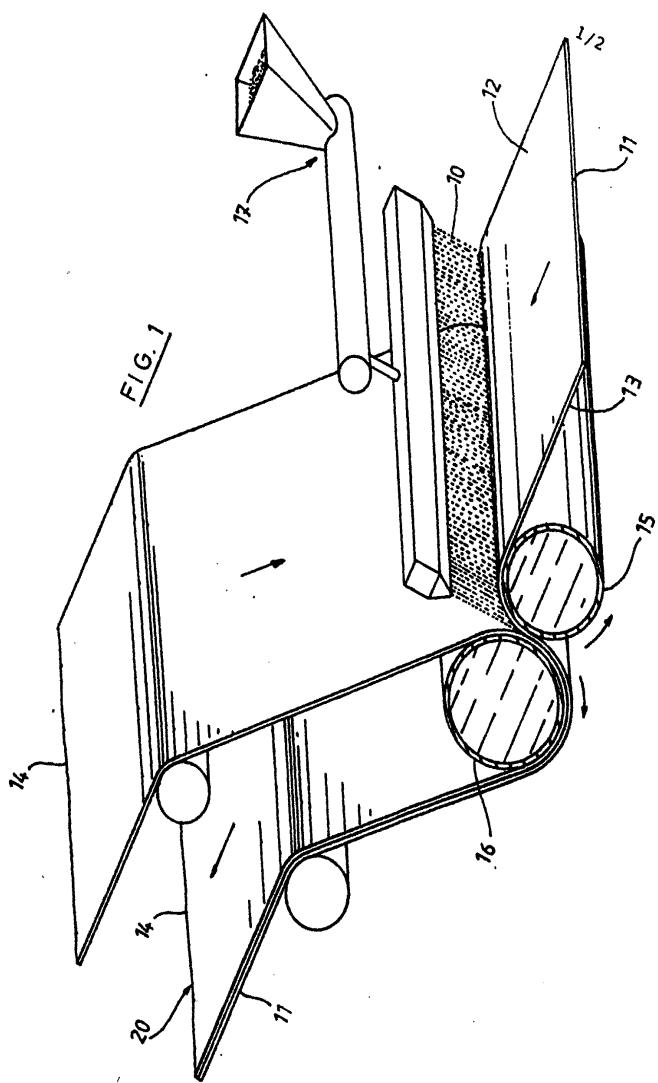
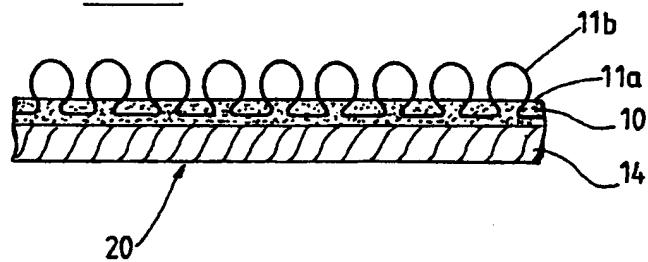
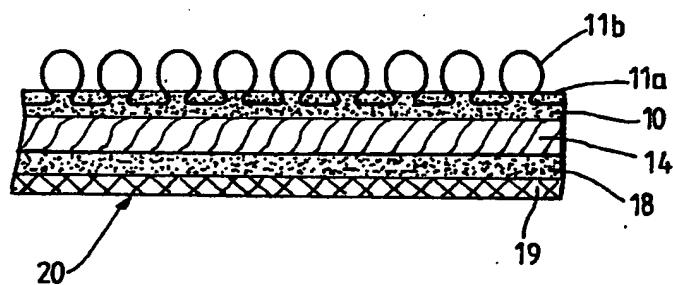


FIG. 2FIG. 3

INTERNATIONAL SEARCH REPORT

Int'l Application No
PCT/BE 94/00002A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 D06N7/00 B32B27/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 D06N B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB,A,971 958 (THE DOW CHEMICAL COMPANY) 7 October 1964 see page 2, line 88 - line 99; claims 1,6-8; figure 3 see page 3, line 93 - page 4, line 59 see page 4, line 116 - page 5, line 16	1,3-6,9, 10,12, 17,18
X	GB,A,1 526 800 (JAPAN SYNTHETIC RUBBER COMPANY LIMITED) 27 September 1978 see page 17, line 16 - line 40; figures	1-6,9, 10,12, 16,18 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *B* earlier document but published on or after the international filing date
- *L* document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *Z* document member of the same patent family

1

Date of the actual completion of the international search

14 March 1994

Date of mailing of the international search report

25.03.94

Name and mailing address of the ISA

European Patent Office, P.B. 5018 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Pamies Oille, S

INTERNATIONAL SEARCH REPORT

Int'l. Application No
PCT/BE 94/00002

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CHEMIEFASERN/TEXTILINDUSTRIE MAN-MADE FIBER vol. 41, no. 10, October 1991, FRANKFURT/MAIN, DE pages 1235 - 1236 A. ADDODO ET AL. 'MEHRSCHEIDIGER PP-BELAG FÜR AUTOBÖDEN' see page 1235, right column, paragraph 3 - page 1236, last paragraph; figures 5,6 ---	1,5-15, 17,19
A	see page 1235, right column, paragraph 3 - page 1236, last paragraph; figures 5,6 ---	3
X	EP,A,0 518 014 (HÜLS AKTIENGESELLSCHAFT) 16 December 1992 see column 3, line 51 - column 4, line 30; claims; example ---	1,2,5-7, 9-13,17 3,8,16
P,X	WO,A,93 15909 (TENNESSEE VALLEY PERFORMANCE PRODUCTS, INC.) 19 August 1993 see page 15, line 21 - page 16, line 26; claims; figures see page 26, line 17 - page 27, line 6 ---	1,5,6,9, 10,12, 13,17,18
P,A	DE,U,92 12 210 (GEBING, THOMAS) 11 February 1993 see page 11, line 23 - page 12, paragraph 2; claims; figure 1 ---	2-4,7,8, 11
A	WO,A,91 01221 (SANBORN) 7 February 1991 see claims 17-19; figures 3-5 ---	1,2,5,6, 9,10, 12-15,18
A	DE,A,27 27 285 (FORD-WERKE AG) 12 January 1978 see claims; figure ---	1-5
P,A	WO,A,93 12285 (TARKETT PEGULAN AG) 24 June 1993 see page 3, paragraph 4 - page 5, paragraph 2; claims; examples ---	9-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/BE 94/00002

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
GB-A-971958		BE-A-	538252	
		BE-A-	638232	
		BE-A-	638233	
		DE-B-	1028284	
		DE-B-	1232545	
		FR-A-	1359514	
		FR-A-	1366196	
		GB-A-	977550	
		NL-A-	293522	
		NL-A-	293524	
GB-A-1526800	27-09-78	JP-C-	1182198	09-12-83
		JP-A-	51073035	24-06-76
		JP-B-	58010437	25-02-83
		DE-A, C	2557123	24-06-76
		US-A-	4081414	28-03-78
EP-A-0518014	16-12-92	DE-A-	4117275	03-12-92
WO-A-9315909	19-08-93	US-A-	5240530	31-08-93
		AU-B-	3609993	03-09-93
DE-U-9212210	11-02-93	EP-A-	0583504	23-02-94
WO-A-9101221	07-02-91	US-A-	5076870	31-12-91
		EP-A-	0483221	06-05-92
		JP-T-	4506780	26-11-92
DE-A-2727285	12-01-78	GB-A-	1570303	25-06-80
WO-A-9312285	24-06-93	DE-A-	4140580	17-06-93
		DE-A-	4228570	03-03-94
		AU-B-	3086492	19-07-93